JSD WATER COMPANY (PWS 6060037)
SOURCE WATER ASSESSMENT FINAL REPORT

March 3, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for JSD Water Company, in Bingham County, Idaho* describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for these sources. **The results should not be used as an absolute measure of risk, and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighted system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in another category, results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories: inorganic chemical (IOC, i.e., nitrates, arsenic) contaminants, volatile organic chemical (VOC, i.e., petroleum products) contaminants, synthetic organic chemical (SOC, i.e., pesticides) contaminants, and microbial contaminants (i.e., bacteria). As different water sources can be subject to various contamination settings, separate scores are given for each type of contaminant.

JSD Water Company (PWS# 6060037) is a community drinking water system that provides water for subdivisions located near Moreland approximately four miles west of Blackfoot. The water system currently has two well sources: Well #1 (North well) and Well #2 (Well house well), and the system alternates use of the wells as the primary and backup water sources. The two wells are manifolded, and water is pumped to a 2000-gallon steel pressure tank located in the well house, before being sent to the distribution system. The water system uses up to 200 gallons per minute (gpm) during peak usage periods. The PWS serves approximately 200 persons through 58 unmetered connections. During 2003, JSD Water Company and several other PWSs in this area are planning to merge into the Moreland Water and Sewer District to serve water to the greater Moreland area.

The potential contaminant sources identified within the delineated time-of-travel (TOT) zones include a major transportation corridor (U.S. Route 26), a major surface water source (People's Canal) and the network of irrigation canals. Other possible contaminant sources were aboveground storage tank (AST) sites, underground storage tank (UST) sites, and leaking underground storage tank (LUST) sites. There were sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resource Conservation Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Release Inventory (TRI). Dairies and a feed lot are located within the delineation along with deep injection wells, a wastewater land application site, and mines/quarries.

In addition, local businesses were included that have the potential to contaminate due to the nature or type of business. A complete list of potential contaminant sources is provided with this assessment.

For the assessment, a review of laboratory tests for JSD Water Company was conducted using the State Drinking Water Information System (SDWIS). Throughout the water system's history, bacteria have been detected in the distribution system eight times, none of which were found at the sample location for the wells. In June 2000, bacteria were present in routine samples and a boil advisory was required. No SOCs or VOCs have been detected in the water samples taken for the wells. However, the IOCs arsenic, barium, fluoride, mercury, and nitrate were detected. Each chemical detected did not meet or exceed the maximum contaminant level (MCL) as established by the EPA. Although the arsenic detected in 1995 was below the MCL of 0.05 mg/L, the system should note that in October 2001, the EPA lowered the arsenic MCL to 0.01 mg/L, giving systems until 2006 to comply with the new standard.

The Idaho Department of Environmental Quality (DEQ) in 2001 conducted a sanitary survey for the JSD Water Company. The survey provides a system overview and lists improvements that should be made by the water system to ensure compliance with DEQ regulations (IDAPA 58.01.08). DEQ required improvements for the drinking water wells including: installation of a sample tap on the discharge line for Well #2, repair the well seal for Well #2, and installation of approved casing vents for both wells.

The capture zones for the wells intersect a priority area for the SOC atrazine. The organic priority areas are areas where more than 25% of the wells show levels greater than 1% of the primary standard or other health standards. Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

The susceptibility ratings for the JSD Water Company drinking water system were based upon available information relating to soil drainage characteristics, agricultural land use, system construction, and potential contaminant sources identified within each well's zone of contribution. The final susceptibility rankings for Well #1 and Well #2 were high for IOCs, VOCs, SOCs, and automatically high for microbial contaminants. The automatic high rating resulted from the repeat bacteria detections in June 2000 indicating a pathway for contamination already exists. The system construction and hydrologic sensitivity scores were high for both wells. The potential contaminant and land use scores for the wells were considered high for IOCs, VOCs, SOCs, and moderate for microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the JSD Water Company, drinking water protection activities should focus on keeping the system in compliance as outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). There should be no application or storage of herbicides, pesticides, or other chemicals within 50 feet of a PWS well. Septic tank systems in proximity to the wells should be investigated. The system should continue their efforts to keep the distribution system free of microbial contamination. When the drinking water is chlorinated for disinfection, a commercial grade National Science Foundation (NSF) approved, chlorine solution should be used rather than household beach. To learn the most appropriate chlorinating measures for your water system, contact Barbara Jones, the Drinking Water Coordinator for the DEQ Pocatello Regional Office. Any new sources that could be considered potential contaminants that reside within a well's zone of contribution should be investigated and monitored to evaluate the threat of contamination the source may pose in the future. Land uses within most of the source water assessment area are outside the jurisdiction of JSD Water Company. Therefore partnerships with federal, state and local agencies, industry, and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating staff and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil Conservation District. Since a major transportation corridor (i.e., U.S. Route 26) intersects the delineation, the Idaho Department of Transportation should be involved in protection efforts. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR
JSD WATER COMPANY, BINGHAM COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water system for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk, and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The information necessary to develop a drinking water protection program should be determined by the local community and be based upon its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

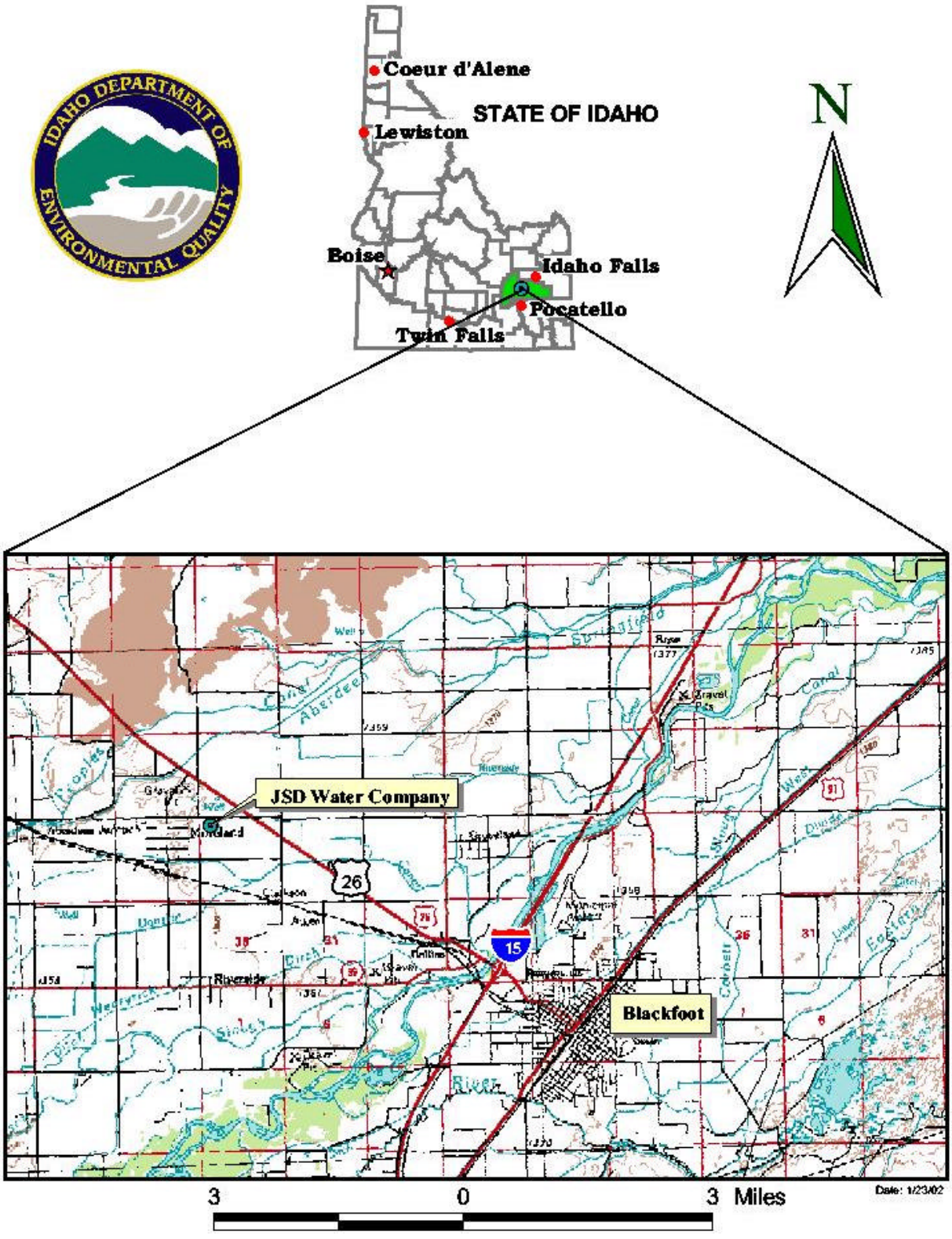
General Description of the Source Water Quality

JSD Water Company (PWS# 6060037) is a community drinking water system that provides water for subdivisions located near Moreland approximately four miles west of Blackfoot (see Figure 1). The water system currently has two well sources: Well #1 (North well) and Well #2 (Well house well), and the system alternates use of the wells as the primary and backup water sources. The two wells are manifolded and water is pumped to a 2000-gallon steel pressure tank located in the well house, before being sent to the distribution system. The water system uses up to 200 gallons per minute (gpm) during peak usage periods. The PWS serves approximately 200 persons through 58 unmetered connections. During 2003, JSD Water Company and several other PWSs in this area are planning to merge into the Moreland Water and Sewer District to serve water to the greater Moreland area.

For the assessment, a review of laboratory tests for JSD Water Company was conducted using the State Drinking Water Information System (SDWIS). Throughout the water system's history, bacteria have been detected in the distribution system eight times, none of which were found at the sample location for the wells. In June 2000, bacteria were present in routine samples and a boil advisory was required. No synthetic organic chemicals (SOCs) or volatile organic chemicals (VOCs) have been detected in the water samples taken for the wells. However, the inorganic chemicals (IOCs) arsenic, barium, fluoride, mercury, and nitrate were detected. Each chemical detected did not meet or exceed the maximum contaminant level (MCL) as established by the EPA. Although the arsenic detected in 1995 was below the MCL of 0.05 mg/L, the system should note that in October 2001, the EPA lowered the arsenic MCL to 0.01 mg/L, giving systems until 2006 to comply with the new standard.

The capture zones for the wells intersect a priority area for the SOC atrazine. The organic priority areas are areas where more than 25% of the wells show levels greater than 1% of the primary standard or other health standards. Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

FIGURE 1 - Geographic Location of JSD Water Company, PWS: 6060037



Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International, Inc. (WGI) was contracted by DEQ to define zones of contribution for nearby PWS's. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the East Margin Area of the Eastern Snake River Plain (ESRP) hydrologic province. The computer model used information that was assimilated by the WGI using site specific data from a variety of sources including nearby well logs, operator records, and hydrogeologic reports. Although there are two drinking water wells associated with this system, the delineation in this assessment represents both wells based upon similarities in hydrogeologic characteristics. A summary of the hydrogeologic information from the WGI Source Area Delineation Report is provided below.

The East Margin Area encompasses 821 square miles, representing approximately 8 percent of the total area of the ESRP hydrologic province. The majority of the East Margin Area is within Bingham County, with small areas occurring in Bannock, Bonneville, and Power counties.

The regional ESRP aquifer is the most significant aquifer in the East Margin Area and consists primarily of basalt of the Quaternary-aged Snake River Group. However, additional water-bearing units are used for water supply along the margin of the ESRP. In order of decreasing age, the most significant aquifers in the Michaud Flats area are bedded rhyolite (volcanic rock) of the Tertiary-aged Starlight Formation and Quaternary-aged pediment gravels formed by running water, basalt of the Big Hole Formation, and stream deposits of the Sunbeam Formation (see Jacobson, 1982, p. 7, and Corbett, et al., 1980, pp. 6-10). A few shallow domestic wells in the central Michaud Flats area also are completed in Michaud Gravel, which is the shallow water-table aquifer. The American Falls Lake Beds Formation (AFLB) confines the deeper aquifers and averages 80 feet in thickness in the central Michaud Flats area (Jacobson, 1984, p. 6). The AFLB pinches out in the eastern Michaud Flats area near the Portneuf River, effectively combining the shallow and deep stream deposits into a single water table aquifer (Bechtel, 1994, p. 2-2). Other aquifers in the East Margin Area include fractured quartzite that has been developed near Blackfoot, stream deposits near the cities of Firth and Basalt, and pediment gravels in the Gibson Terrace area near Tyhee and Chubbuck.

PWS wells in the East Margin Area of the ESRP province produce water from five different aquifers: the Regional ESRP aquifer, three alluvial or stream deposited aquifers (Eastern Michaud Flats, Firth/Basalt, and Gibson Terrace/Pocatello Bench), and a quartzite aquifer near Blackfoot. The conceptual model for the Regional ESRP Aquifer in which the JSD Water Company PWS resides is presented below.

Regional Eastern Snake River Plain Aquifer

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary-aged basalt flows of the Snake River Group, which are between layers of rocks formed by sediment deposition along the margins (Garabedian, 1992, p. 5). Quaternary-aged basalts are estimated to be 100 to 1,500 feet thick, with the majority of the area in the range of 100 to 500 feet thick (Whitehead, 1992, Plate 3). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and stream-produced sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest, along with sedimentary rocks and metamorphic rocks (altered by heat and/or pressure) (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched or separated from the main ground water by unsaturated rock, such as the Lewisville-to-Shelley reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood rivers, rivers entering from the north vanish into the basalts of the Snake River Plain aquifer that have a higher ability to transmit water.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gpm are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 square feet per second (ft^2/sec) to 56 ft^2/sec ($1.0x10^4$ to $4.8x10^6$ $feet^2$/day; Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p.15).

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 feet/mile and average 12 feet/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. The estimated effective ratio of the rock's open space volume to its total volume range from 0.04 to more than 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p. 16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11), and locally from canal leakage. Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River canyon near Thousand Springs and near American Falls and Blackfoot (Garabedian, 1992, p. 17). To a lesser degree, discharge also occurs through pumping and underflow.

The East Margin Area is among the most transmissive regions of the regional aquifer, therefore it has a higher ability to transmit water. A transmissivity of 21 ft^2/sec was used to represent the upper 200 feet of the regional aquifer in the East Margin Area in the three-dimensional U.S. Geological Survey (USGS) ground water flow model (Garabedian, 1992, Plate 6). The equivalent hydraulic conductivity or the rate at which water can move through permeable material is 9,072 feet/day. This value is consistent with the range of hydraulic conductivity, the rate water flows through a cross section, (9,500 to 11,708 feet/day) calculated using data from a constant-rate aquifer test conducted in 1981 (Jacobson, 1982, p. 23). This range was calculated by dividing the estimated transmissivity (228,000 to 281,000 $feet^2$/day) by the perforated interval of the observation well (24 feet). The geometric mean hydraulic conductivity based on analysis of specific capacity data from PWS wells (135 feet/day) is significantly lower. A published water table map of the Upper Snake River Basin (Idaho Department of Water Resources (IDWR), 1997, p. 9) indicates that the ground water flow direction in the ESRP aquifer in the East Margin Area is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Recharge from precipitation and surface water irrigation in the East Margin Area ranges from less than 10 to more than 20 inches per year (Garabedian, 1992, Plate 8). The low end of the range applies to the area near Blackfoot, while the high end applies to the area on the west side of American Falls Reservoir near Aberdeen.

Kjelstrom (1995, p. 13) reports an annual river loss of 280,000 acre-feet to the regional basalt aquifer for the 27.5-mile Lewisville-to-Shelley reach of the Snake River and 110,000 acre-feet for the 23.5-mile Shelley-to-Blackfoot reach. Annual river gains of 1,900,000 acre-feet for the 36.6-mile Blackfoot-to-Neeley reach are also estimated (Kjelstrom, 1995, p. 13). A seepage study conducted in the fall of 1980 on the Portneuf River showed a gain of about 560 cubic feet per second (cfs) (405,691 acre-feet) for the 13-mile Pocatello-to-American Falls Reservoir reach (Jacobson, 1982, p. 16). The average flow in the Blackfoot River near the city of Blackfoot is low at Station #13068500 (5.2 cfs; USGS, 2001) compared to the flow in the Snake River near the city of Blackfoot at Station #13069500 (2,900 cfs; USGS, 2001).

The delineated source water assessment area for JSD Water Company drinking water wells is narrow, elongated in shape, and trends to the northeast. The delineation is approximately 28 miles in length with the narrowest area near the wellheads approximately 1,500 feet wide. The widest area of the delineation near the center of the delineation is approximately 5 miles (See Appendix A – Figure 2). The actual data used in determining the source water assessment delineation are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during 2002 and 2003. The first phase involved identifying and documenting potential contaminant sources within the JSD Water Company source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add additional potential contaminant sources that exist within the delineated area. The enhanced inventory was completed with the assistance of Mr. Dan Hawkes and one additional potential contaminant source was added to the assessment. A figure showing well locations, the delineated area, and potential contaminant sources are provided with the report (See Appendix A – Figure 2). Potential contaminant sources have been given unique site numbers to reference tabular information associated with the public water source.

The potential contaminant sources identified within the delineated TOT zones include a major transportation corridor (U.S. Route 26), a major surface water source (People's Canal) and a network of irrigation canals. Other possible contaminant sources were aboveground storage tank (AST) sites, underground storage tank (UST) sites, and leaking underground storage tank (LUST) sites. There were sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resource Conservation Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Release Inventory (TRI). Dairies and a feed lot are located within the delineation along with deep injection wells, a wastewater land application site, and mines/quarries. In addition, local businesses were included that have the potential to contaminate due to the nature or type of business. A complete list of potential contaminant sources is provided with this assessment (See Appendix A – Table 2).

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for a well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix B contains a susceptibility analysis worksheets for each well in the assessment. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the water producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface, and a water depth of more than 300 feet from the surface protect the ground water from contamination. Also, with all factors equal, water taken from a greater ground water depth will result in contaminant reduction through absorption and/or other dispersion mechanisms (Idaho Source Water Assessment Plan, 1999, p. E-59).

The hydrologic sensitivity rated high for both wells. The regional soil classifications within the delineated area are predominantly moderate- to well- drained as defined by the National Resource Conservation Service (NRCS). A well log for Well #2 was unavailable to assess the hydrologic sensitivity, but the well is located approximately 25 feet from Well #1 and most likely has similar subsurface characteristics to Well #1. According to the well log for Well #1, the vadose zone composition is mostly sand and gravel. The static water levels for both wells are approximately 40-45 feet below ground surface (bgs). Based upon the static water level and the lithology for Well #1, the depth to first ground water is considered to be less than 300 feet from the surface. Although there are minor amounts of clay in the subsurface, there is no evidence of a cumulative 50-foot thick fine-grained zone present in the lithologic data for Well #1 to show that a low permeable barrier exists.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities.

When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The IDWR *Well Construction Standards Rules (1993)* require all PWSs to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. Pump tests for wells producing greater than 50 gpm require a minimum of a 6-hour test. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. Although a well log was available for Well #1, it did not meet all of the current IDWR standards for a public drinking water source. Since there was no well construction information available for Well #2, it was conservatively rated and also did not meet all the current IDWR standards.

The system construction scores were rated high for both wells. Both wells are located outside of a 100-year floodplain. The wellheads and surface seals are not acceptable because Well #2 should have the well seal repaired, and they both lack approved well vents. Venting the well casing may prevent a vacuum from forming when the well is turned on and cause the casing to slough. The vent should be down-turned and 18-inches above the ground surface. The vent should also have a 24-mesh non-corrodible screen to prevent insects and animals from entering the well casing.

According to well log information, Well #1 was drilled in February 1980. The static water level at drilling time was 45 feet bgs. The well's annular seal is 21 feet bgs and was set into a layer of sand and gravel. The well casing extends into gray basalt. Well #1 has an 8-inch diameter casing (+18 inches to 53 feet bgs) and a 6-inch diameter casing (38 feet to 78 feet bgs) that are 0.250-inches thick. The required casing thicknesses for 6-inch and 8-inch diameter wells are 0.280-inch and 0.322 inch, respectively. A pump test was conducted for Well #1 with a discharge of 120 gpm that was pumped to 112 feet bgs for a one-hour period. Since the well is not screened, the highest water production interval is likely to be at the bottom of the casing, which is less than 100 feet below the well's static water level.

Information obtained from JSD Water Company indicated that Well #2 was drilled in 1975. The static water level at the time (1996) was approximately 40 feet bgs. Information relating to the well's annular seal, casing extent, and casing thickness were unavailable. The well flow is 150 gpm with a pump depth to 84 feet bgs. Without adequate well log information to identify the highest water production interval, the well is conservatively rated and considered to be less than 100 feet below the well's static water level.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zone of water contribution is assessed to determine each well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The land use in this area is considered irrigated cropland.

In terms of potential contaminant sources and land use susceptibility, both wells rated high for IOCs (i.e., nitrates), VOCs (i.e., petroleum related products), SOCs (i.e., pesticides) and moderate for microbial contaminants (i.e., bacteria). Refer to Appendix A – Table 2 for a complete list of sources identified in the potential contaminant inventory.

Final Susceptibility Rating

A detection above a drinking water standard (MCL), any detection of a VOC, SOC, a confirmed detection of bacteria, or having potential contaminant sources within 50 feet of the wellhead will automatically give a high susceptibility rating to the final well ranking despite the land use of the area because a pathway for contamination already exists. If potential contaminant sources are within 50 feet of a wellhead, this will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year TOT zone (Zone 1B), and a large percentage of agricultural land contribute greatly to the overall ranking.

The final susceptibility rankings for Well #1 and Well #2 were high for IOCs, VOCs, SOCs, and automatically high for microbial contaminants. The automatic high rating resulted from the repeat bacteria detections in June 2000. The system construction and hydrologic sensitivity scores were high for both wells. The potential contaminant and land use scores for the wells were considered high for IOCs, VOCs, SOCs, and moderate for microbial contaminants. Refer to Table 1 for the susceptibility analysis summary.

Table 1. Summary of JSD Water Company Susceptibility Analysis.

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	H	H	H	M	H	H	H	H	H*
Well #2	H	H	H	H	M	H	H	H	H	H*

[1]**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility**
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Auto high rating for confirmed bacteria detection in June 2000

Susceptibility Summary

The IOCs (arsenic, barium, fluoride, mercury, and nitrate) represent the main water chemistry recorded for the JSD Water Company PWS. The reported concentrations of these chemicals were below the MCL for each chemical. All water chemistry tests for the JSD Water Company wells have not detected VOCs and SOCs.

Although the arsenic detection in 1995 was below the MCL, it should be noted that the EPA lowered the arsenic MCL to 0.01 mg/L in October 2001, giving systems until 2006 to comply with the new standard.

Total coliform bacteria have been detected eight times in the water system, none of which were found at the sample location for the wells. In June 2000, bacteria were present in routine samples and a boil advisory was required.

In this area, the county level nitrogen fertilizer, herbicide, and overall agriculture-chemical uses are considered high. This is related to the amount of agricultural land in this area. Although there may only be a small portion of agriculture land in direct vicinity of the wellheads, it is useful as a tool in determining the overall chemical usage such as pesticides, and how they may impact ground water through infiltration and surface water runoff. Potential contaminant sources were identified within the wells delineated capture zones and were documented (see Appendix A – Figure 2, Table 2).

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For drinking water protection, the JSD Water Company needs to properly maintain and protect the wellheads. Protection includes no application or storage of herbicides, pesticides, or other chemicals within 50 feet from the wellhead. Septic tank systems in proximity to the wells should be investigated. If microbial contamination becomes a concern, the system should take appropriate measures to disinfect the system. When drinking water is chlorinated for disinfection, a commercial grade National Science Foundation (NSF) approved, chlorine should be used rather than household beach. To learn the most appropriate chlorinating measures for your water system, contact Barbara Jones, the Drinking Water Coordinator for the DEQ Pocatello Regional Office. If nitrates or other IOC levels increase, the system should investigate remediation options such as reverse osmosis.

Once drinking water wells are protected, the system can focus on documenting types and locations of potential contaminant sources. These potential contaminant sources can be point sources, such as a new gas station, or non-point sources, such as storm water runoff. Any new sources that may be considered potential contaminants should be investigated and if need be monitored to prevent future contamination. Land uses within the area should also be evaluated. Areas with higher than normal agricultural land use may have increases in agricultural wastewater runoff that could infiltrate the ground water. Land uses within most of the source water assessment area are beyond the jurisdiction of JSD Water Company. Therefore partnerships with federal, state and local agencies, industry, and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating staff and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil Conservation District. As a major transportation corridor (i.e., U.S. Route 26) intersects the delineation, the Idaho Department of Transportation should be involved in protection efforts. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning ordinances) or non-regulatory (e.g., public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

DEQ Pocatello Regional Office (208) 236-6160

DEQ State Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper at (208) 343-7001 or email her at mlharper@idahoruralwater.com for assistance with drinking water protection (formerly wellhead protection) strategies.

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POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as a Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Appendix A

JSD Water Company
Delineation Map and Potential Contaminant Sources Table

Table 2. JSD Water Company Well #1 and Well #2 Potential Contaminant Inventory.

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
	People's Canal	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Highway 26	0-3	GIS Map	IOC, VOC, SOC, Microbials
1	Well Drilling	0-3	Database Inventory	IOC, VOC, SOC
2	CERCLA Site	0-3	Database Inventory	IOC, VOC, SOC
3	Mine/Quarry	0-3	Database Inventory	IOC, VOC, SOC
4	Deep Injection Well	0-3	Database Inventory	IOC, VOC, SOC, Microbials
5	Wastewater Land Application Site	0-3	Database Inventory	IOC, Microbials
6	Landfill	0-3	Database Inventory	IOC, VOC, SOC, Microbials
7	Landfill	0-3	Database Inventory	IOC, VOC, SOC, Microbials
8	Feed Lot	0-3	Database Inventory	IOC, Microbials
9	UST Site-Not Listed; Closed	3-6	Database Inventory	VOC, SOC
10	CERCLA Site	3-6	Database Inventory	IOC, VOC, SOC
11	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
12	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
13	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
14	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
15	LUST Site-Cleanup Completed; Impact Unknown	6-10	Database Inventory	VOC, SOC
16	LUST Site-Cleanup Completed; Impact Unknown	6-10	Database Inventory	VOC, SOC
17	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
18	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
19	UST Site-Other; Closed	6-10	Database Inventory	VOC, SOC
20	UST Site-Other; Open	6-10	Database Inventory	VOC, SOC
21	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
22	UST Site-Gas Station; Closed	6-10	Database Inventory	VOC, SOC
23	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
24	UST Site-Gas Station; Closed	6-10	Database Inventory	VOC, SOC
25	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
26	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
27	UST Site-Auto Dealership; Closed	6-10	Database Inventory	VOC, SOC
28	UST Site-Utilities; Closed	6-10	Database Inventory	VOC, SOC
29	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
30	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
31	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
32	UST Site-Contractor; Open	6-10	Database Inventory	VOC, SOC
33	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
34	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
35	UST Site-Local Government; Closed	6-10	Database Inventory	VOC, SOC
36	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
37	UST Site-Truck/Transporter; Open	6-10	Database Inventory	VOC, SOC
38	UST Site-Auto Dealership; Closed	6-10	Database Inventory	VOC, SOC
39	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
40	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
41	UST Site-Local Government; Open	6-10	Database Inventory	VOC, SOC
42	UST Site-Gas Station; Closed	6-10	Database Inventory	VOC, SOC
43	UST Site-Utilities; Closed	6-10	Database Inventory	VOC, SOC
44	UST Site-Auto Dealership; Closed	6-10	Database Inventory	VOC, SOC
45	UST Site-Auto Dealership; Closed	6-10	Database Inventory	VOC, SOC
46	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
47	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
48	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
49	UST Site-Other; Closed	6-10	Database Inventory	VOC, SOC
50	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
51	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
52	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
53	UST Site-Truck/Transporter; Open	6-10	Database Inventory	VOC, SOC
54	UST Site-Gas Station; Closed	6-10	Database Inventory	VOC, SOC
55	Dairy	6-10	Database Inventory	IOC
56	Dairy	6-10	Database Inventory	IOC
57	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
58	Automobile Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
59	Hydraulic Equipment-Repairing	6-10	Database Inventory	VOC, SOC
60	Trucking	6-10	Database Inventory	VOC, SOC
61	Aircraft Servicing & Maintenance	6-10	Database Inventory	IOC, VOC, SOC
62	Veterinarians	6-10	Database Inventory	IOC, VOC
63	Concrete Contractors	6-10	Database Inventory	IOC, VOC, SOC
64	Boat Dealers	6-10	Database Inventory	VOC, SOC
65	Steel Fabricators	6-10	Database Inventory	IOC, VOC
66	Oils-Fuel (Wholesale)	6-10	Database Inventory	VOC, SOC
67	General Contractors	6-10	Database Inventory	IOC, VOC, SOC
68	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
69	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
70	Automobile Dealers-New Cars	6-10	Database Inventory	VOC, SOC
71	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
72	Industrial Machinery/Equipment	6-10	Database Inventory	VOC, SOC
73	Tree Service	6-10	Database Inventory	VOC, SOC
74	Garbage Collection	6-10	Database Inventory	IOC, VOC, SOC
75	Garbage Collection	6-10	Database Inventory	IOC, VOC, SOC
76	Property Maintenance	6-10	Database Inventory	IOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
77	Boxes-Folding-Manufacturers	6-10	Database Inventory	VOC
78	Grinding Wheels (Manufacturers)	6-10	Database Inventory	IOC, VOC
79	Service Stations-Gasoline & Oil	6-10	Database Inventory	VOC, SOC
80	Service Stations-Gasoline & Oil	6-10	Database Inventory	VOC, SOC
81	Automobile Lubrication Service	6-10	Database Inventory	IOC, VOC, SOC
82	Automobile Dealers-New Cars	6-10	Database Inventory	VOC, SOC
83	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
84	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
85	Concrete Contractors	6-10	Database Inventory	IOC, VOC, SOC
86	Bus Lines	6-10	Database Inventory	VOC, SOC
87	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
88	General Contractors	6-10	Database Inventory	IOC, VOC, SOC
89	Oils-Fuel (Wholesale)	6-10	Database Inventory	VOC, SOC
90	Controls Systems/Regulators	6-10	Database Inventory	IOC, VOC, SOC
91	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
92	Cleaners	6-10	Database Inventory	VOC
93	Gazebos	6-10	Database Inventory	IOC, VOC
94	Service Stations-Gasoline & Oil	6-10	Database Inventory	VOC, SOC
95	Truck-Dealers-Used	6-10	Database Inventory	VOC, SOC
96	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
97	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
98	Painters	6-10	Database Inventory	VOC
99	Electric Motors-Dlrs/Repairing (Wholesale)	6-10	Database Inventory	IOC, VOC
100	Hardware-Retail	6-10	Database Inventory	IOC, VOC, SOC
101	Aircraft Servicing & Maintenance	6-10	Database Inventory	IOC, VOC, SOC
102	Movers	6-10	Database Inventory	VOC, SOC
103	Service Stations-Gasoline & Oil	6-10	Database Inventory	VOC, SOC
104	Paving Contractors	6-10	Database Inventory	VOC, SOC
105	Engines-Diesel (Wholesale)	6-10	Database Inventory	VOC, SOC
106	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
107	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
108	Oils-Fuel (Wholesale)	6-10	Database Inventory	VOC, SOC
109	Service Industry Machinery (Manufacturers)	6-10	Database Inventory	VOC, SOC
110	Painters	6-10	Database Inventory	VOC
111	Trucking-Motor Freight	6-10	Database Inventory	VOC, SOC
112	Automobile Body-Repairing & Painting	6-10	Database Inventory	IOC, VOC, SOC
113	Boat Dealers	6-10	Database Inventory	VOC, SOC
114	Automobile Parts & Supplies-Retail	6-10	Database Inventory	VOC, SOC
115	Automobile Customizing	6-10	Database Inventory	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
116	Tools-Electric (Wholesale)	6-10	Database Inventory	IOC, VOC
117	Snowmobiles	6-10	Database Inventory	VOC, SOC
118	General Contractors	6-10	Database Inventory	IOC, VOC, SOC
119	Gas Companies	6-10	Database Inventory	VOC, SOC
120	Demolition Contractors	6-10	Database Inventory	IOC, VOC, SOC
121	Storage-Household & Commercial	6-10	Database Inventory	IOC, VOC, SOC
122	Automobile Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
123	Home Builders	6-10	Database Inventory	IOC, VOC, SOC
124	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
125	Automobile Parts & Supplies-Retail	6-10	Database Inventory	VOC, SOC
126	Truck-Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
127	Movers	6-10	Database Inventory	VOC, SOC
128	House & Building Movers	6-10	Database Inventory	VOC, SOC
129	Wrecker Service	6-10	Database Inventory	IOC, VOC, SOC
130	Veterinarians	6-10	Database Inventory	IOC, VOC
131	Painters	6-10	Database Inventory	VOC
132	Trailers-Horse (Wholesale)	6-10	Database Inventory	VOC, SOC
133	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
134	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
135	X-Ray Laboratories-Industrial	6-10	Database Inventory	IOC, VOC, SOC
136	Photographers-Portrait	6-10	Database Inventory	VOC
137	General Contractors	6-10	Database Inventory	IOC, VOC, SOC
138	Building Contractors	6-10	Database Inventory	IOC, VOC, SOC
139	Automobile Parts & Supplies-Retail	6-10	Database Inventory	VOC, SOC
140	Carpet & Rug Cleaners	6-10	Database Inventory	VOC
141	Electric Equipment & Supplies-Wholesale	6-10	Database Inventory	IOC, VOC
142	Photographers-Portrait	6-10	Database Inventory	VOC
143	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
144	Laboratories-Dental	6-10	Database Inventory	IOC, VOC, SOC
145	Lawn Mowers	6-10	Database Inventory	VOC, SOC
146	Laboratories-Testing	6-10	Database Inventory	IOC, VOC, SOC
147	Dairies	6-10	Database Inventory	IOC
148	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
149	Hardware-Retail	6-10	Database Inventory	IOC, VOC, SOC
150	Plumbing Drain & Sewer Cleaning	6-10	Database Inventory	IOC, VOC
151	Truck Renting & Leasing	6-10	Database Inventory	VOC, SOC
152	Excavating Contractors	6-10	Database Inventory	IOC, VOC, SOC
153	Screen Printing	6-10	Database Inventory	VOC
154	Storage-Household & Commercial	6-10	Database Inventory	IOC, VOC, SOC
155	Veterinarians	6-10	Database Inventory	IOC, VOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
156	Car Washing & Polishing	6-10	Database Inventory	IOC, VOC, SOC
157	Storage-Household & Commercial	6-10	Database Inventory	IOC, VOC, SOC
158	Automobile-Antique & Classic	6-10	Database Inventory	VOC, SOC
159	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
160	Government-Forestry Services	6-10	Database Inventory	VOC, SOC
161	Cleaners	6-10	Database Inventory	VOC
162	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
163	Delivery Service	6-10	Database Inventory	VOC, SOC
164	Tree Service	6-10	Database Inventory	VOC, SOC
165	Recycling Centers (Wholesale)	6-10	Database Inventory	IOC, VOC, SOC
166	Automobile Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
167	Pile Driving Equipment (Manufacturers)	6-10	Database Inventory	VOC, SOC
168	Truck Renting & Leasing	6-10	Database Inventory	VOC, SOC
169	Federal Government-National Security	6-10	Database Inventory	VOC, SOC
170	Truck-Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
171	Excavating Contractors	6-10	Database Inventory	IOC, VOC, SOC
172	Well Drilling	6-10	Database Inventory	IOC, VOC, SOC
173	Machine Shops	6-10	Database Inventory	IOC, VOC, SOC
174	Recycling Centers (Wholesale)	6-10	Database Inventory	IOC, VOC, SOC
175	Transmissions-Automobile	6-10	Database Inventory	IOC, VOC, SOC
176	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
177	Service Stations-Gasoline & Oil	6-10	Database Inventory	VOC, SOC
178	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
179	Welding Equipment & Supplies (Wholesale)	6-10	Database Inventory	IOC, VOC
180	Storage-Household & Commercial	6-10	Database Inventory	IOC, VOC, SOC
181	Metalworking Machinery (Manufacturers)	6-10	Database Inventory	IOC, VOC
182	Snowmobiles	6-10	Database Inventory	VOC, SOC
183	Tree Service	6-10	Database Inventory	VOC, SOC
184	Leather Gloves & Mittens (Manufacturers)	6-10	Database Inventory	VOC
185	Truck Stops	6-10	Database Inventory	VOC, SOC
186	Limousine Service	6-10	Database Inventory	VOC, SOC
187	Toxic Release Inventory	6-10	Database Inventory	VOC, SOC
188	RCRA Site	6-10	Database Inventory	SOC
189	RCRA Site	6-10	Database Inventory	IOC, VOC, SOC
190	RCRA Site	6-10	Database Inventory	IOC, VOC, SOC
191	RCRA Site	6-10	Database Inventory	VOC, SOC
192	RCRA Site	6-10	Database Inventory	IOC, VOC, SOC
193	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
194	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
195	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
196	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
197	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
198	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
199	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
200	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
201	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
202	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
203	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
204	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
205	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
206	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
207	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
208	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
209	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
210	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
211	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
212	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
213	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
214	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
215	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
216	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
217	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
218	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
219	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
220	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
221	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
222	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
223	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
224	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
225	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
226	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
227	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
228	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
229	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
230	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
231	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
232	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
233	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
234	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
235	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
236	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
237	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
238	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
239	SARA Site	6-10	Database Inventory	VOC, SOC
240	SARA Site	6-10	Database Inventory	VOC, SOC
241	SARA Site	6-10	Database Inventory	VOC, SOC
242	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
243	SARA Site	6-10	Database Inventory	VOC, SOC
244	SARA Site	6-10	Database Inventory	VOC, SOC
245	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
246	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
247	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
248	SARA Site	6-10	Database Inventory	VOC, SOC
249	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
250	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
251	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
252	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
253	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
254	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
255	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
256	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
257	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
258	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
259	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
260	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
261	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
262	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
263	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
264	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
265	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
266	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
267	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
268	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
269	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
270	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
271	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
272	AST Site	6-10	Database Inventory	VOC, SOC

[1]UST = Underground storage tank, LUST = Leaking Underground storage tank , CERCLA = Comprehensive Environmental Response Compensation and Liability Act, RCRA = Resource Conservation Recovery Act , SARA = Superfund Amendments and Reauthorization Act, AST = Aboveground storage tank

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3]IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix B

JSD Water Company
Susceptibility Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.20**)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.375**)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : JSD WATER COMPANY Source: WELL #1

Public Water System Number: 6060037 2/21/03 4:28:26 PM

1. System Construction		SCORE
Drill Date	2/26/80	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		5

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	10	8	8	7
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	10	6	7	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12

Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0

Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

Cumulative Potential Contaminant / Land Use Score		27	25	29	14
4. Final Susceptibility Source Score		16	16	17	16
5. Final Well Ranking		High	High	High	High

Ground Water Susceptibility Report Public Water System Name : JSD WATER COMPANY Source: WELL #2
Public Water System Number: 6060037 2/21/03 4:28:26 PM

1. System Construction		SCORE				
Drill Date	1975					
Driller Log Available	NO					
Sanitary Survey (if yes, indicate date of last survey)	YES	2001				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	NO	1				
Casing and annular seal extend to low permeability unit	NO	2				
Highest production 100 feet below static water level	NO	1				
Well located outside the 100 year flood plain	YES	0				
Total System Construction Score		5				
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	NO	2				
Vadose zone composed of gravel, fractured rock or unknown	YES	1				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	NO	2				
Total Hydrologic Score		6				
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score	
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2	
Farm chemical use high	YES	2	0	2		
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO	
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2	
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)	YES	10	8	8	7	
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8	
Sources of Class II or III leacheable contaminants or	YES	10	6	7		
4 Points Maximum		4	4	4		
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0	
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4	
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12	
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present	YES	2	2	2		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1		
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0	
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present	YES	1	1	1		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1		
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0	
Cumulative Potential Contaminant / Land Use Score		27	25	29	14	
4. Final Susceptibility Source Score		16	16	17	16	
5. Final Well Ranking		High	High	High	High	